MECHANICS.

344. Proposed by J. ROSENBAUM, New Haven, Conn.

Two bodies of equal masses, and coefficients of friction μ_1 and μ_2 are connected by a light, flexible string, and placed on an inclined plane. What is the angle, θ, between the string and the plane if the inclination, α, of the plane is a minimum when the bodies are on the point of motion?

345. Proposed by J. L. RILEY, Northeastern State Normal School, Tahlequah, Okla.

Two particles A and B are together in a smooth circular tube. A attracts B with a force whose acceleration is ω^2 and moves along the tube with uniform angular velocity 2ω, B being initially at rest: prove that the angle Φ subtended by AB at the center after a time t is given by the equation

$$\log \tan \frac{\pi + \Phi}{4} = \omega t.$$

NUMBER THEORY.

263. Proposed by J. L. RILEY, Northeastern State Normal School, Tahlequah, Okla.

To find values, positive integral, which verify the equation

$$X^3 + 2 = Y^2 \qquad \text{(Gerono).}$$

264. Proposed by C. F. GUMMER, Kingston, Ontario.

Find a general formula for three squares in arithmetical progression. Is it possible for the common difference to be a perfect square?

SOLUTIONS OF PROBLEMS.

ALGEBRA.

A solution of 464, by Mrs. Elizabeth Brown Davis, was received after selections had been made for publication.

455. Proposed by JOS. B. REYNOLDS, Lehigh University.

Solve for x_n (not in determinant form) the simultaneous equations,

$$\tfrac{4}{3}x_n + 2x_{n-1} + 2x_{n-2} \cdots 2x_4 + 2x_3 + 2x_2 + 2x_1 = g,$$

$$\tfrac{10}{3}x_n + \tfrac{22}{3}x_{n-1} + 8x_{n-2} \cdots 8x_4 + 8x_3 + 8x_2 + 8x_1 = 4g,$$

$$\tfrac{16}{3}x_n + \tfrac{40}{3}x_{n-1} + \tfrac{52}{3}x_{n-2} \cdots 18x_4 + 18x_3 + 18x_2 + 18x_1 = 9g,$$

$$\tfrac{22}{3}x_n + \tfrac{58}{3}x_{n-1} + \tfrac{82}{3}x_{n-2} + \tfrac{94}{3}x_{n-3} \cdots 32x_4 + 32x_3 + 32x_2 + 32x_1 = 16g,$$

$$\tfrac{28}{3}x_n + \tfrac{76}{3}x_{n-1} + \tfrac{112}{3}x_{n-2} + \tfrac{136}{3}x_{n-3} + \tfrac{148}{3}x_{n-4} \cdots = 25g,$$

. . . .

$$(\tfrac{1}{3} + 2n - 1)x_n + (\tfrac{1}{3} + 6n - 5)x_{n-1} + (\tfrac{1}{3} + 10n - 13)x_{n-2} + (\tfrac{1}{3} + 14n - 25)x_{n-3} \cdots (\tfrac{1}{3} + 2n^2 - 1)x_1 = n^2 g.$$

Solution by C. F. Gummer, Kingston, Ont.

The equations may be written

$$2x_n + 3x_{n-1} + 3x_{n-2} + \cdots + 3x_1 = \frac{3g}{2},$$

$$5x_n + 11x_{n-1} + 12x_{n-2} + \cdots + 12x_1 = \frac{12g}{2},$$

$$8x_n + 20x_{n-1} + 26x_{n-2} + 27x_{n-3} + \cdots + 27x_1 = \frac{27g}{2},$$

. . . .

$$(3n - 1)x_n + (9n - 7)x_{n-1} + \cdots + (3n^2 - 1)x_1 = \frac{3n^2 g}{2},$$